## REMARKS

In the outstanding Office Action, the Examiner objected to the drawings; objected to claims 14-31, and 33; rejected claims 14-31 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,270,257 ("Shin") in view of U.S. Patent No. 5,949,116 ("Wen"); and rejected claims 32-33 under 35 U.S.C. § 103(a) as being unpatentable over Shin and Wen and further in view of U.S. Patent No. 6,228,763[1] ("Lee '763").

By the present Amendment, Applicants have amended claims 14, 18, 22, and 27. Claims 14-33 are pending.

### Objections to the drawings under 37 C.F.R. 1.83(a)

The Examiner objected to the drawings alleging that the drawings do not show every feature of the invention as specified in the claims. Specifically, the Examiner alleged that claim 14 at line 12, "forming an insulator film on said impurity diffusion region," is not shown in the drawings, and that instead, the insulator film is shown as being formed in the second groove, what the Examiner calls the "second trench." Office Action, page 3.

Contrary to the Examiner's allegation, Figures 3E and 4C-4D show an "insulator film" 12, as being formed on an "impurity diffusion region" 2. This is further stated in the specification at, for example, page 12, lines 24-32 and again at, for example, page 13 lines, 21-25. Thus, Applicants submit that the drawings show every feature of the invention as specified in the claims, and are in compliance with 37 C.F.R. § 1.83(a).

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[1] Although in the outstanding Office Action the Examiner cited U.S. Patent No. 6,248,622, attributed to Lee, it is believed that the Examiner meant to cite U.S. Patent No. 6,228,763 also attributed to Lee, as in previous Office Actions. *See* Footnote 2.

Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw the objection to the drawings.

**Objections to the claims**

The Examiner objected to claims 14-31 and 33, asserting that independent claims 14, 18, 22, and 27 are not clear, thus rendering all dependent claims as objectionable for sharing the lack of clarity of the independent claims. Specifically, the Examiner alleges that the phrase "forming a gate insulator film in said second groove *with controlling a thickness* of the gate insulator film" (emphasis added) is not clear, and suggests replacing "with" with and. Office Action, page 4.

Applicants initially note that neither claim 33, nor claim 32, from which claim 32 depends, contain any noted informalities. If claim 33 is objected to, applicants respectfully request that the Examiner clarify the objectionable material in claim 33.

With regard to the remaining claims to which the Examiner objected, Applicants have amended claims 14, 18, 22, and 27, to incorporate the Examiner's suggestions, and to improve clarity. Applicants therefore request the Examiner to withdraw the objection to claims 14-31.

**Rejection under 35 U.S.C. § 103(a)**

The Examiner rejected claims 14-31 under 35 U.S.C. § 103(a) as being unpatentable over Shin further in view of Wen; and rejected claims 32-33 under 35 U.S.C. § 103(a) as being unpatentable over Shin, Wen, and Lee '763.

Regarding the rejection of claims 14-33 under 35 U.S.C. § 103(a), Applicants respectfully disagree with the Examiner's arguments and conclusions as set forth in the Office Action.

To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. (See M.P.E.P. §2143.03 (8th ed. 2001)). Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." (M.P.E.P. §2143 (8th ed. 2001)).

Claims 14 and 18

Claims 14 and 18 recite a combination including, "removing a second film to form a second groove" and "forming a gate insulator film in said second groove." Shin and Wen, either taken alone or in combination, do not teach or suggest at least these elements. The Examiner alleges that in Shin, in Figures 3b and 3c, either element 23 or element 25 can be considered "the second film." Office Action, page 5. However, element 23 is a gate oxide, and element 25 is an oxide layer. Neither of these elements can be considered a second film. Furthermore, even if 23 or 25 could be construed as a second film, neither element 23 nor 25 are removed to "form a second groove." Thus, contrary to the Examiner's allegations, the cited portion of Shin does not teach at least the element of "removing a second film to form a second groove," as recited in claims 14 and 18.

Furthermore, since Shin fails to teach at least the element "removing a second film to form a second groove," Shin also fails to teach at least the element a "second

groove." Shin thus fails to teach or suggest "forming a gate insulator in said second groove."

The Examiner alleges that Wen cures the deficiencies of Shin. Specifically, the Examiner states that Wen teaches "removing a second film to form a second groove," citing Figures 2B and 2C, wherein elements 201 and 207, as the "second film" are removed to form a second groove element 209 of Figure 2C. Office Action page 6. The Examiner further alleges that Wen teaches or suggests the element "forming a gate insulator film in said second groove" at element 203. *Id.* However, gate insulator film 203 is not formed in groove 209. Contrary to the Examiner's allegation, gate insulator film 203 of Wen is formed on substrate 205 (Figure 2A), prior to the formation of the alleged "second groove" 209. This is also recited in Wen at, for example, column 2 lines 37-39. Therefore, Wen, fails to teach the element of "forming a gate insulator in said second groove." Since, Shin, whether taken alone, or in combination with Wen, fails to teach or suggest each and every element of claims 14 and 18, a *prima facie* case of obviousness has not been made. Therefore, Applicants respectfully request that the rejection of claims 14 and 18 under 35 U.S.C. § 103(a) be withdrawn.

Claims 15-17 depend from claim 14. Claims 19-21 depend from claim 18. Since Shin in view of Wen fails to teach each and every element of claims 14 and 18, that combination of references also fails to teach each and every element of the dependent claims. Therefore, a *prima facie* case of obviousness has not been made, and the rejection of claims 15-17 and 19-21 should be withdrawn.

Claims 22 and 27

Claims 22 and 27 recite a combination including, "forming a gate insulator film in said groove on the semiconductor substrate with controlling a thickness of the gate

insulator film so that a top surface of said gate insulator film is higher than a top surface of said impurity diffusion region." As above, with respect to claims 14 and 18, neither Shin nor Wen, either taken alone or in combination teach or suggest at least "forming a gate insulator film in said groove and controlling a thickness of the gate insulator film so that a top surface of said gate insulator film is higher than a top surface of a impurity diffusion region". Specifically, even if element 23 of Shin (Figure 3b) is considered to be a gate insulator film formed in a groove, the thickness of the alleged gate insulator film 23 is not such that the top surface of the gate insulator film is higher than a top surface of the impurity diffusion region, Figure 3c, element 26 a,b.

Wen does not cure this deficiency. As above, gate insulator film 203 (Figure 2A) is not formed in a groove, but rather on substrate 205. While from the figures it appears that the top surface of the gate insulator film 203, is higher than the impurity diffusion region 200, Wen fails to teach the element of "*controlling a thickness* of the gate insulator film" (emphasis added). Thus, Shin, whether taken alone, or in combination with Wen, fails to teach or suggest "forming a gate insulator film in said groove and controlling a thickness of the gate insulator film so that a top surface of said gate insulator film is higher than a top surface of a impurity diffusion region," as recited in claims 22 and 27. Therefore, since Shin, in combination with Wen fails to teach or suggest each and every element of claims 22 and 27, a *prima facie* case of obviousness has not been made.

Even if Shin and Wen, in combination, could be reasonably construed to teach every element of the claim, there is no motivation to incorporate the teachings of Wen into the MOS device of Shin, in the manner that the Examiner is suggesting The MOS

devices of Shin and Wen have very different structural characteristics, and are formed very differently, and the Examiner is suggesting that one of ordinary skill in the art would have been motivated to basically take the structure of Wen in Figures 2A-2C and place them into Shin as shown in Figure 3a. Office Action at pages 5-6. Specifically, with reference to claims 22 and 27, there is no motivation for modifying the structure of Shin wherein the gate insulator film is formed in a groove, with the teaching of Wen which teaches a gate insulator film that has a top surface higher than a top surface of an impurity diffusion region. Therefore, since there is no motivation for combining the references in the manner that the Examiner is suggesting, a *prima facie* case of obviousness has not been made. Since the Examiner has failed to make a *prima facie* case of obviousness, Applicants respectfully request that the rejection of claims 22 and 27 under 35 U.S.C. § 103(a) be withdrawn.

Claims 23-26 depend from claim 22. Claims 28-31 depend from claim 27. Since Shin in view of Wen fails to teach each and every element of claims 22 and 27, that combination of references also fails to teach each and every element of the dependent claims. Therefore, a *prima facie* case of obviousness has not been made, and the rejection of claims 23-26 and 28-31 should be withdrawn.

Claim 32

Claim 32 recites a combination including, "selectively depositing semiconductor layers serving as source/drain regions so that an inclined surface is formed between the top surface of said semiconductor substrate and said channel region." Shin, whether taken alone, or in any reasonable combination with Wen or Lee '763, fails to teach at least this element. The Examiner alleges that Shin teaches selectively depositing

source/drain regions 26a,b (Figure 3e) so that an inclined surface is formed between the top surface of the substrate 21 (Figure 3a) and the channel region. Office Action, page 8. Contrary to the Examiner's allegation, Shin fails to teach or suggest an inclined surface between the top surface of semiconductor substrate 21 (Figure 3a) and channel region 26a-b (Figure 3e). The top surface of semiconductor substrate 21 (Figures 3a-3c) appears flat and there is nothing in the specification that suggests an inclined surface. The inclined surface in Shin is instead between the high concentration source/drain regions 28a,b and the low concentration source/drain regions 26a,b (Figure 3e).

Wen does not cure the deficiencies of Shin. Wen shows a semiconductor substrate 205 (Figure 2A) source region 200, but fails to show an inclined surface between the source region 200 and substrate 205. Lee '763, cited only for the T-shaped cross-section[2], does not cure the deficiencies of the Shin and Wen combination. Since, Shin, when taken in combination with Wen and Lee, fails to teach or suggest each and every element of claim 33, a *prima facie* case of obviousness has not been made. Accordingly, Applicants respectfully request the withdrawal of the rejection of claim 33 under 35 U.S.C. § 103(a).

Claim 33 depends from claim 32. Claims 28-31. Since Shin in view of Wen and Lee '763 fails to teach each and every element of claim 32, that combination of references also fails to teach each and every element of the dependent claims. Therefore, a *prima facie* case of obviousness has not been made, and the rejection of claim 33 should be withdrawn.

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[2] The T-shaped cross-section is not found in Lee '622, as cited by the Examiner, but is found, at the locations cited by the Examiner in the Office Action, in Lee '763.

## Conclusion

In view of the foregoing remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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